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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicants: Joachim Kiefer and Oemer Uensal  
Application No.: 10/506,622 Group: 1796  
371(c) Date: December 08, 2004 Examiner: Pezzuto, Helen L.  
Confirmation No: 5172  
For: MIXTURE COMPRISING SULPHONIC ACID CONTAINING  
VINYL, POLYMER ELECTROLYTE MEMBRANE  
COMPRISING POLYVINYLSULPHONIC ACID AND THE USE  
THEREOF IN FUEL CELLS

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|---|-------------------------|
| <b>CERTIFICATE OF MAILING OR TRANSMISSION</b>   |                         |
| I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or is being facsimile transmitted to the United States Patent and Trademark Office on: |                         |
| <u>3-10-09</u>  | <u>Sandra J. Jarmel</u> |
| Date  | Signature               |
| <u>Sandra Jarmel</u>  |                         |
| Typed or printed name of person signing certificate   |                         |

DECLARATION OF DR. THOMAS J. SCHMIDT UNDER 37 C.F.R. §1.132

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

I, Dr. Thomas J. Schmidt, am a citizen of the Federal Republic of Germany and reside at Frankfurt, Germany, hereby declare and state as follows:

1. I am a fully trained chemist, having studied and graduated in chemistry at University of Ulm, Germany and prepared my PhD. thesis at University of Ulm in Fuel Cell Research. I held positions at Ernest Orlando Lawrence Berkeley

National Laboratory in Berkeley, CA and at Paul-Scherrer-Institute, Switzerland, both in applied fuel cell research and development.

I am well acquainted with technical English.

2. I, Dr. Thomas J. Schmidt state that I have more than 5 years scientific practice in applied fuel cell membrane and membrane electrode assembly work and that I consider myself qualified by my education, knowledge and many years of experience to make this Declaration. I currently hold the position of R&D Director at BASF Fuel Cell GmbH (previously named PEMEAS GmbH).

I have read and understood the instant applications and the pending claims.]

3. Experiments carried out under my supervision show that a proton conducting membrane prepared by the method described below, wherein the polyazole polymer film was doped with 7% by weight of polyvinyl-containing phosphonic acid, possesses conductivity at 160 °C that is less than 0.00001 S/cm ( $10^{-5}$  S/cm).
4. In the experiments carried out under my supervision, proton-conducting electrolyte membranes were prepared according to the following method:
  - (a) a polyazole polymer film was expanded with an aqueous solution of a 10% by weight of vinyl phosphonic acid (VPA) at room temperature for 24 hours; and
  - (b) the vinyl phosphonic acid present in the liquid of step (a) was polymerized.

After step (a) has been performed, a doping ratio was measured based on weight variation of the polymer film before and after expansion. It was found that, after expansion, the polymer film included about 9% by weight of VPA and the proton-conducting electrolyte membrane, after

polymerization in step (b), contained about 7% by weight of polyvinyl-containing phosphonic acid.

Next, the conductivity of the membrane that resulted after step (b) was measured at 160 °C. It was found that the conductivity was less than  $10^{-5}$  S/cm.

5. I further declare that all statements herein of my own knowledge are true and that all statements made on information in belief are believed to be true; and further that the statements are made with the knowledge that willful false statements of the like so made are punishable by fine or imprisonment or both Under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereof.

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Dr. Thomas J. Schmidt

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Date